

In the Claims:

1. (currently amended) Spherical luminescent silica gel particles containing a transparent silica gel matrix, said transparent silica gel matrix having at least one luminescent substance, said particles exhibiting at least one property selected from the group consisting of:

the size of said particles being between 0.5 μm and 50 μm ;

said at least one luminescent substance of said particles being selected from the group consisting of luminescent markers, semi-conductor nanocrystals, semiconductors from the Group IVA of the periodic table, up-converting phosphors and luminescent proteins; and

said particles containing a magnetic colloid; [[and]]

wherein said silica gel matrix of said particles ~~including~~ comprise functional groups which can be coupled with biomolecules.

2. (currently amended) The particles according to claim 1, wherein said particles are non-autofluorescent.

3. (previously presented) The particles according to claim 1, wherein said silica gel particles encapsulate said at least one luminescent substance.

4. (currently amended) The particles according to claim 1, wherein said at least one luminescent substance is selected from the group of substances which displays a phenomenon selected from the group consisting of fluorescence, phosphorescence, chemoluminescence, electroluminescence and a luminescence energy transfer.

5. (previously presented) The particles according to claim 1, wherein the concentration of

said at least one luminescent substance is 1 to 10%-wt.

6. (previously presented) The particles according to claim 1, wherein said at least one luminescent substance has an emission frequency and wherein any two of said at least one luminescent substance display different emission frequencies.

7. (previously presented) The particles according to claim 1, wherein said at least one luminescent substance is a molecule having an excitation frequency and an emission frequency, and wherein said excitation frequency is higher than said emission frequency.

8. (withdrawn – currently amended) ~~Particles~~ The particles according to claim 1, wherein said at least one luminescent substance consists of semiconductor nanocrystals formed from elements selected from the groups of the periodic ~~system~~ table of elements consisting of Group IIIA, Group VA, Group IIB, Group VIA and Group IVA.

9. (withdrawn – currently amended) ~~Particles~~ The particles according to Claim 8, wherein said luminescent semiconductor nanocrystals are doped with at least one of copper or silver additives.

10. (withdrawn – currently amended) ~~Particles~~ The particles according to claim 1, wherein said at least one luminescent substance has an excitation frequency and an emission frequency and wherein said excitation frequency is lower than said emission frequency.

11. (withdrawn – currently amended) ~~Particles~~ The particles according to Claim 10, wherein said at least one luminescent substance is [[a]] at least one microcrystalline compound selected from the group consisting of rare earths and yttrium having at least one element selected from the group of the periodic table of elements consisting of Group

VIA [[or the]] and Group VIIA.

12. (withdrawn – currently amended) ~~Particles~~ The particles according to claim 1, wherein said at least one luminescent substance is a metal-chelate compound having a central atom, said central atom being selected from the group of the periodic ~~system~~ table of elements consisting of Group VIII, Group IB, Group IIB and the group of rare earths.

13. (withdrawn – currently amended) ~~Particles~~ The particles according to claim 1, wherein said at least one luminescent substance is a pyrrole dye.

14. (previously presented) The particles according to claim 1, wherein said at least one luminescent substance is a luminescent protein.

15. (currently amended) The luminescent ~~polymer~~ silica particles according to claim 1, ~~further comprising a magnetic colloid~~, wherein said silica gel particles encapsulate said magnetic colloid.

16. (previously presented) The particles according to claim 15, wherein said magnetic colloid is selected from the group consisting of ferro-magnetic compounds, ferri-magnetic compounds, superparamagnetic compounds and ferrofluids.

17. (previously presented) The particles according to claim 15, wherein said magnetic colloid is present in a concentration of 10-50% by weight relative to the silica gel particle.

18. (previously presented) The particles according to claim 15, wherein said silica gels have functional groups that can be coupled to at least one biomolecule, said at least one biomolecule being selected from the group consisting of proteins, peptides, cell receptors, nucleic acids, nucleic acid fragments, polysaccharides, oligosaccharides, antibodies, antibody-fragments, streptavidin, avidin, biotin and enzymes.

19. (currently amended) A process for ~~the production of~~ producing spherical, luminescent silica gel particles which contain a transparent silica gel matrix having at least one luminescent substance in said silica gel matrix, said process comprising the steps of:

condensing a mixture consisting of a diluted acid and alkoxysilanes to a clear silica sol;

homogenously mixing the clear silica sol with at least one luminescent substance to form a sol-luminescence substance mixture;

dispersing the sol-luminescence substance mixture in an organic phase that is not miscible with water; and

adding a base to the sol-luminescence substance mixture during or after said dispersing step ~~in order~~ for cross-linking said sol-luminescence substance mixture.

20. (canceled)

21. (currently amended) The process according to claim 19, wherein said organic phase that is not miscible with water contains at least one surfactive substance in a concentration of 0.1 to 15 % by volume.

22. (previously presented) The process according to claim 19, wherein the volume ratio of sol to organic phase is 1:5 to 1:30.

23. (previously presented) The process according to claim 19, wherein said dispersing and cross-linking steps have a duration of 2 to 30 seconds.

24. (canceled)

25. (previously presented) A sensor for array technology or for nucleic acid sequencing

comprising luminescent silica gel particles containing a transparent silica gel matrix and at least one luminescent substance in said transparent silica gel matrix, for at least one of the analysis or diagnostic testing of nucleic acids, nucleic acid fragments, proteins, peptides, antibodies, antibody fragments, cells, cell receptors and biotinylated biomolecules and testing protein or nucleic acid libraries.

26. (previously presented) The process according to claim 19 and further comprising the step of adding a substance selected from the group consisting of a ferro-magnetic substance, a ferri-magnetic substance and a superparamagnetic substance to the sol-luminescence substance mixture in an amount of 10-50% by weight.

27. (previously presented) The process according to claim 19, and further including the step of mixing an aqueous solution of organic polymer, a polysaccharide or a protein in an amount of 1-20% by volume with the sol before said dispersing step.

28. (previously presented) The particles according to claim 15, wherein said silica gels have functional groups that are coupled to at least one biomolecule, said at least one biomolecule being selected from the group consisting of proteins, peptides, cell receptors, nucleic acids, nucleic acid fragments, polysaccharides, oligosaccharides, antibodies, antibody-fragments, streptavidin, avidin, biotin and enzymes.

29. (withdrawn) The particles according to claim 15, wherein said silica gel particles have functional groups being coupled to at least one biomolecule amino bearing group, said biomolecule amino bearing group being selected from the group consisting of proteins, peptides, nucleic acids and oligonucleotides, the selected amino groups being substituted at the 5'-end.

30. (previously presented) The particles according to claim 15, wherein said silica gel particles have functional groups being coupled to the biomolecule streptavidin.

31. (currently amended) Spherical, luminescent silica gel particles containing a transparent silica gel matrix, said transparent silica gel matrix having at least one luminescent substance, said particles exhibiting at least one property selected from the group consisting of:

the size of said particles being between 0.5 μm and 50 μm ;

said at least one luminescent substance of said particles being selected from the group consisting of luminescent markers, semi-conductor nanocrystals, semiconductors from the Group IVA of the periodic table, up-converting phosphors and luminescent proteins;

said particles containing a magnetic colloid; and

said silica gel matrix of said particles including functional groups which can be coupled with biomolecules, wherein said luminescent silica gel particles are formed by a process comprising the steps of:

condensing a mixture consisting of a diluted acid and alkoxysilanes to a clear silica sol;

homogenously mixing the clear silica sol with at least one luminescent substance to form a sol-luminescence substance mixture;

dispersing the sol-luminescence substance mixture in an organic phase that is not miscible with water; and

adding a base to the sol-luminescence substance mixture during or after

said dispersing step ~~in order~~ for cross-linking said sol-luminescence substance mixture, wherein said silica gel matrix comprises functional groups for being coupled with biomolecules.

32. (withdrawn) The use of spherical, luminescent silica gel particles containing a transparent silica gel matrix for at least one of the analysis and diagnostic of nucleic acids, nucleic acid fragments, proteins, peptides, antibodies, antibody fragments, cells, cell receptors, biotinylated molecules and for testing protein or nucleic acid libraries, as sensors in the context of array technology or for nucleic acid sequencing, said transparent silica gel matrix having at least one luminescent substance, said particles exhibiting at least one property selected from the group consisting of:

the size of said particles being between 0.5 μm and 50 μm ;

said at least one luminescent substance of said particles being selected from the group consisting of luminescent markers, semi-conductor nanocrystals, semiconductors from the Group IVA of the periodic table, up-converting phosphors and luminescent proteins;

said particles containing a magnetic colloid; and

said silica gel matrix of said particles including functional groups which can be coupled with biomolecules.